# A NEW *PEROMYSCUS* (RODENTIA: CRICETIDAE) FROM THE PLEISTOCENE OF MARYLAND



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Cumberland Cave near Corriganville, Allegany County, Maryland, was partially excavated during the period 1912-1915 by James W. Gidley of the U. S. National Museum. An extensive collection of Pleistocene vertebrates, primarily large mammals (41 genera, 16 per cent extinct) was recovered and described (Gidley and Gazin, 1938).

Recent field work at the site by Carnegie Museum field parties has added to the faunal list—terrestrial gastropods, diplopods, fish, amphibians, and additional species and genera of reptiles, birds, and mammals. Mammalian genera new to the fauna include at least *Condylura, Parascalops, Pipistrellus, Clethrionomys, Paradipoides,* and *Megalonyx.*

Gidley regarded the age of the fauna as mid-Pleistocene. Preliminary comparisons of the Cumberland Cave microfauna with those of late Pleistocene sites in the Appalachians (New Paris No. 4, Guilday, Martin, McCrady, 1964; Natural Chimneys, Guilday, 1962; Bootlegger Sink, Guilday, Hamilton, McCrady, 1966) corroborates Gidley's opinion—the fauna is pre-Wisconsin, presumably Illinoian.

At least two species of *Peromyscus* are present. One larger than any Recent species known from north of Mexico, is here described as new. The other (or others), identified, in part as *Peromyscus* cf. *leucopus* (Rafinesque) in Gidley and Gazin (1938: 59), are here considered *Peromyscus* ?species (fig. 2h).

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Fig. 1:

*Peromyscus floridanus* (Chapman)

**a.** C.M. Mammal No. 19508, lingual view, left mandible.

**b.** C.M. Mammal No. 19508, crown view.

*Peromyscus* ***cumberlandensis*** new species

**c.** C.M. Vert. Fossil No. 12604, type specimen, left mandible, crown view.

**d.** C.M. Vert. Fossil No. 12604, lingual view.

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Photographs are by W. G. Barton.



## *Peromyscus* cumberlandensis new species

Figure 1c,d

TYPE: CM 12604, left lower jaw with full dentition.

HORIZON AND TYPE LOCALITY: Cumberland Cave, ½ mile south of Corriganville, Allegany County, Maryland, on Western Maryland Railway property[1]. Latitude 31° 42′ 30″ N., longitude 78° 47′ 15″ W., altitude 800′; from surface talus on north side of railroad cut. Pleistocene (pre-Wisconsin, presumably Illinoian).

REFERRED SPECIMENS: CM 8015, 8018-8022, 8036, 12545-12566, 12567-12580, 12586-12602, 2 left, 2 right maxillae; 3 partial right mandibles; 9 left, 4 right isolated $M^1$'s; 2 left, 2 right $M^2$'s; 2 left $M^3$'s; left maxilla fragment with $M^2$-$M^3$; 11 left, 5 right $M_1$'s; 9 left, 7 right $M_2$'s; 3 partial humeri, 3 calcanea.

DIAGNOSIS: Bones and teeth larger and more massive than in the Central American subgenera *Isthmomys* Hooper and Musser, and *Megadontomys* Merriam; dentition moderately complicated; mesostyle (id) and mesoloph (id) both present in $M^1$ 100%, $M^2$ 75%, $M_1$ 45%, $M_2$ 33%; anterior rim of zygomatic arm of maxilla rises from base of infraorbital foramen parallel with the posterior rim; posterior borders of incisive foramen extend back as far as anterior root of $M^1$; humerus with well developed entepicondylar foramen.

DISCUSSION: The mandible (fig. 1c, d) is large and massive with a stout incisor, a well-defined masseteric ridge and a deep, well defined area of insertation for *M. pterygoideus internus* on the lingual surface of the angular process. It is significantly larger than that of *P. californicus*, the largest species north of Mexico. Mandibles approach or equal in size those of the sub-tropical *P. pirrensis*, *P. thomasi*, and *P. nelsoni*.

[1]Since this manuscript went to press, *Peromyscus cumberlandensis* has been found in Pleistocene deposits from Trout Cave, 3 miles south of Franklin, Pendleton County, West Virginia (Carnegie Museum collection), and the Ladd's Quarry local fauna, Barstow County, Georgia (U.S. National Museum Collection, C. E. Ray, letter).

TABLE 1

MEASUREMENTS (IN MM.) OF LOWER JAWS, VARIOUS SPECIES OF *Peromyscus*

| Species | Locality number (see Table 3) | Total length incl. incisors | | | Depth at, but not incl., $M_1$ | | |
|---|---|---|---|---|---|---|---|
| | | $\overline{X}$ | O.R. | N | $\overline{X}$ | O.R. | N |
| *floridanus* | 4 | 17.6 | 16.2–18.7 | 8 | 3.6 | 3.5–3.9 | 4 |
| *californicus* | 2 | 18.6 | 17.0–20.1 | 11 | 3.9 | 3.6–4.4 | 11 |
| *thomasi* | 7 | 22.6 | 21.5–24.1 | 12 | 4.5 | 4.1–4.8 | 12 |
| *nelsoni* | 9 | 22.7 | – | 1 | 4.1 | – | 1 |
| *cumberlandensis* | 1 | 22.8 | 22.0–23.1 | 4 | 4.9 | 4.8–5.0 | 4 |
| *pirrensis* | 8 | 26.1 | 25.1–27.3 | 12 | 5.0 | 4.8–5.6 | 12 |

A partial right maxilla, CM 8036, preserves the zygomatic arm and the posterior half of the incisive foramen. In the conformation of the masseteric fossa and the anterior rim of the zygomatic arm, it differs from *P. californicus, P. floridanus, P. maniculatus* and *P. pirrensis* and agrees in character, except for size and rugosity, with *P. thomasi, P. nelsoni,* and *Ochrotomys.* In these latter forms as in *P. cumberlandensis* the anterior rim of the zygomatic arm of the maxilla as it rises from the base of the infraorbital foramen does *not* sweep gently back in a rising arc weakening as it goes but rises straight and strong, more or less parallel with the posterior rim. The area for the insertion of *M. masseter lateralis profundus, pars anterior,* as a result, is more extensive, relatively deeper and rectangular in shape as in *Ochrotomys,* as opposed to triangular and shallower in *P. floridanus, P. californicus,* and *P. maniculatus. P. leucopus* is intermediate in this respect. The process for the origin of *M. masseter superficialis* at the base of the zygomatic arch is not as well developed in *P. cumberlandensis* or *P. pirrensis* as it is in *P. floridanus* or *P. thomasi.* This is undoubtedly subject to individual variation and may not be a valid character, however.

The posterior borders of the incisive foramina extend back as far as the anterior root of $M^1$ as in *P. maniculatus.* In *P. leucopus* the incisive foramina do not reach the level of the first molars. In *P. californicus* and *P. floridanus* they extend one-quarter to one-third of the length of $M^1$ back between the molar rows.

Hooper (1957) and Bader (1959) analyzed 19 species of *Peromyscus* for complexity of the dental typography of first and second molars, pay-

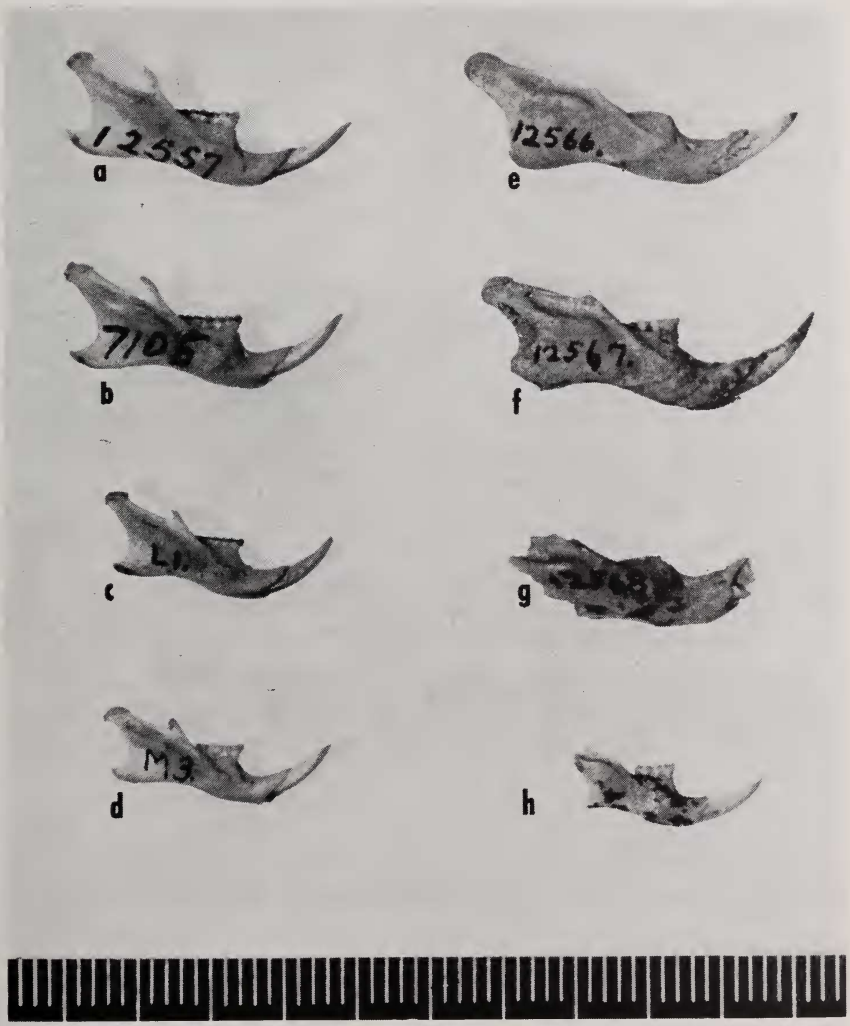


Fig. 2: Left mandibles, various species of *Peromyscus*. Scale in mm.

**a.** *P. californicus* (Gambel). C.M. Mammal No. 12557.
**b.** *P. floridanus* (Chapman). C.M. Mammal No. 7105.
**c.** *P. leucopus noveboracensis* (Fischer). Powdermill Nature Reserve, Pennsylvania. No. L1.
**d.** *P. maniculatus nubiterrae* Rhoads. Powdermill Nature Reserve, Pennsylvania. No. M3.
**e.** ***P. cumberlandensis*** new species. C.M. Vert. Fossil No. 12566.
**f.** ***P. cumberlandensis*** new species. C.M. Vert. Fossil No. 12567.
**g.** ***P. cumberlandensis*** new species. C.M. Vert. Fossil No. 12568.
**h.** *Peromyscus* sp. Pleistocene, Cumberland Cave, Maryland.

ing especial attention to the presence or absence of accessory styles (-ids) and lophs (-ids). Adapted in part from their data, Table 2 lists in crude approximation of increasing complexity the species treated by them, plus original data from Cumberland Cave material, and modern *P. pirrensis* and *P. thomasi.* Precentages refer to instances in which *both* mesostyle (id) and mesoloph (id) are present in a given tooth.

*Peromyscus eremicus* and *P. californicus,* characterized by a simple dental pattern, are, according to Hooper and Musser, 1964, in the subgenus *Haplomylomys, P. floridanus* in the subgenus *Podomys, P. pirrensis* in *Isthmomys, P. thomasi* in the subgenus *Megadontomys,* and the remainder of the species in *Peromyscus* proper. They refer *P. nuttali* to the genus *Ochrotomys.* Hooper (1957) questions defining several of these supra-specific taxa solely upon dental characters that may vary geographically in some forms, although as Bader (1959) points out, such dental distinctions do have validity in some cases.

TABLE 2

INCIDENCE OF MESOTYLE (ID) AND MESOLOPH (ID) IN MOLARS OF VARIOUS SPECIES OF *Peromyscus* [DATA FOR RECENT SPECIES ADAPTED FROM HOOPER (1957) AND BADER (1959)]

| Species | $M^1$ | $M^2$ | $M_1$ | $M_2$ | N |
|---|---|---|---|---|---|
| *eremicus* | 2% | 1% | 2% | 1% | 179 |
| *californicus* | 5 | 1 | 5 | 2 | 107 |
| *crinitus* | 6 | 7 | 0 | 0 | 65 |
| *floridanus* | 30 | 35 | 34 | 1 | 101 |
| *melanophrys* | 45 | 50 | 20 | 5 | 34 |
| *hylocetes* | 65 | 55 | 25 | 20 | 65 |
| *melanotis* | 65 | 65 | 10 | 0 | 61 |
| *leucopus* | 70 | 65 | 50 | 10 | 339 |
| *maniculatus* | 70 | 65 | 22 | 5 | 225 |
| *boylei* | 80 | 70 | 30 | 20 | 405 |
| *polionotus* | 84 | 83 | 44 | 4 | 58 |
| *truei* | 90 | 95 | 40 | 5 | 30 |
| *oaxacensis* | 90 | 95 | 30 | 30 | 34 |
| *mexicanus* | 90 | 95 | 45 | 45 | 128 |
| *difficilis* | 95 | 95 | 80 | 50 | 89 |
| *gossypinus* | 100 | 100 | 37 | 4 | 58 |
| *pirrensis* | 100 | 75 | 88 | 100 | 8 |
| *thomasi* | 100 | 100 | 50 | 50 | 10 |
| *yucatanensis* | 100 | 100 | 85 | 85 | 25 |
| *nuttali* | 100 | 95 | 90 | 95 | 36 |
| *nudipes* | 100 | 100 | 100 | 100 | 29 |

| | | | | |
|---|---|---|---|---|
| *cumberlandensis* | 100 (12)* | 75 (4) | 45 (11) | 33 (12) |
| *Peromyscus,* sp. (Cumberland) | 79 (19) | 38 (3) | 56 (25) | 22 ( 7) |

* Numbers in parentheses refer to number of specimens in sample.

The molar patterns of *P. cumberlandensis* appear to be more complex than those of *P. californicus* and *P. floridanus,* i.e., accessory lophs and styles are present in more cases and more strongly developed. Mesolophs and mesostyles are especially prominent on $M^1$. Mesolophids and mesostylids of $M_2$ are usually prominent. In $M_2$'s of *P. floridanus* from the Pleistocene of Reddick, Florida, mesostylids are weak and mesolophids rise weakly from the anterior wall of the entoconid rather than from the mure.

Despite a larger, more massive skull, the individual molars of *P. cumberlandensis* are no wider than those of *P. floridanus* or *P. californicus;* but they do exceed them in length (Table 3). *P. oklahomensis* (Stephens, 1960), a large Illinoian form known from a single $M_2$ approaches *P. cumberlandensis* in size, but the tooth is relatively narrower; a mesolophid is absent; and the re-entrant valleys broader.

The $M^1$ of *P. cumberlandensis* is shorter and stouter than that of *P. thomasi.* The anteroloph of *P. thomasi* is prominent and the mesostyle much better developed than in *P. cumberlandensis.* The $M^1$ of *P. cumberlandensis* is similar in proportion and degree of complexity to that of *P. pirrensis.* The $M^1$ of *P. pirrensis,* however, possesses an anterolabial loph not present in *P. cumberlandensis,* although both forms have an antero-labial style.

$M^2$ of *P. cumberlandensis* and *P. pirrensis* are almost identical, but the main fold of the molar is much narrower in *P. thomasi* and *P. nelsoni.*

$M_2$ of *P. cumberlandensis* is similar in proportion to that of *P. pirrensis,* but relatively much shorter than $M_2$ of *P. thomasi* and *P. nelsoni.* The prominent ectolophid of *P. thomasi* is absent in *P. cumberlandensis* and the mesolophid of *P. thomasi* is much better developed. The mesolophid of *P. pirrensis* is better developed than that of *P. cumberlandensis* and the mure is nearer the lingual side of the tooth than in *P. cumberlandensis.*

In shape, mandibles of *P. thomasi* and *P. pirrensis* resemble, but are larger than, those of *P. cumberlandensis.* The location of the mental foramen is similar in both *P. thomasi* and *P. cumberlandensis,* but more dorsal in *P. pirrensis.* The masseteric ridge is produced farther forward

on the mandible in *P. cumberlandensis* than in either *P. thomasi* or *P. pirrensis.*

The conformation of the zygomatic arm of the maxilla resembles that of *Ochrotomys.* On the other hand, three referred humeri recovered from the deposit have well developed entepicondylar foramena, lacking in *Ochrotomys* (Rinker, 1960 :276).

The affinities of *P. cumberlandensis* are not clear. The molars are moderately complicated, neither as simple as those of the *Haplomylomys* group nor as complicated as in *Ochrotomys,* or in some of the Mexican species now in *Peromyscus* proper, or in the Central American *Isthmomys* and *Megadontomys* groups. Despite the large size of *P. floridanus* and *P. californicus,* the simple molar patterns, structure of the zygoma and position of the incisive foramena do not resemble those of *P. cumberlandensis. P. oklahomensis* appears to have too simple a molar pattern to be closely related to *P. cumberlandensis.* As taxonomic lines are now drawn, *P. cumberlandensis* appears to be typical of no one subgenus.

*P. cumberlandensis* is about the same size as *Peromyscus pliocenicus* Wilson from the mid-Pliocene Rome fauna (Hemphillian) of Oregon, but differs in several respects. The molars of *P. pliocenicus* are more robust and hypsodont, and the anterocone (id) of the first upper and lower molar is more highly developed. In the lower molars the external re-entrant valleys are broader, resembling *P. oklahomensis* in this respect. The mandible, however, is slightly smaller than in the type specimen of *P. cumberlandensis,* the area for the insertion of the anterior portion of the masseter is shallower, and the mental foramen is placed farther forward and much higher. In the maxilla the conformation of the masseteric fossa and the anterior rim of the zygomatic arm is relatively weakly developed in *P. pliocenicus.* The masseteric fossa is shallow and triangular. In *P. cumberlandensis* it is much deeper, higher, and more rectangular in shape.

### *Peromyscus* ?species

Hooper and Bader have pointed out the large amount of variation in dental patterns of some species of *Peromyscus.* In at least two species (*P. maniculatus* and *P. boylei*) geographic variation within the species is greater than that which differentiates some full species (Hooper, 1957:48). This presents obstacles, to say the least, when attempting to identify species of *Peromyscus* from fossil deposits. Dental characters alone, especially in fragmentary specimens in limited quantity, are

apparently not enough for identification, except in occasional clear-cut cases. Judging by the shape of the anteroconid of $M_1$ there may be two additional species present in the Cumberland Cave fauna: a *leucopus*-like form in which the anteroconid is well developed and bilaterally symmetrical when viewed from above, and a *maniculatus*-like form, apparently the commoner of the two, in which the portion of the anteroconid lying on the buccal side of the anterior median fold appears less well developed, giving the $M_1$ a lopsided appearance. Even this character quickly obscures with age and anyone faced with identification of a large collection of fossil or subfossil *Peromyscus* teeth soon develops a sense of helpless frustration. *Peromyscus leucopus* and *P. maniculatus* occur about Cumberland Cave at the present time. Working with a late Wisconsin fauna, one might be justified in assigning specimens to modern species, but not in older faunas. Measurements and incidence of accessory dental structures are presented in Tables 2 and 3. The collection is referred to *Peromyscus* (*Peromyscus*) ?species.

In Table 3, CM refers to Carnegie Museum, UM to the University of Michigan, and USNM to the United States National Museum.

TABLE 3

Measurments (in mm.) of Molar Teeth, Various Species of *Peromyscus*

localities:
1. Cumberland Cave local fauna, Maryland, Pleistocene.
2. California, Recent. CM Mammal No. 7042, 7063-7066, 7105-7106, 7119, 12521-12522, 12557.
3. Florida, Reddick local fauna, Pleistocene. CM 8486-8490.
4. Florida, Recent. CM Mammal No. 16671, 19340, 19342, 19518-19521, 21756.
5. New Paris No. 4, Pennsylvania, late Pleistocene. (See Guilday, Martin, McCrady, 1964, for catalogue numbers.)
6. Doby Springs local fauna, Oklahoma, Pleistocene. UM 38571.
7. Guerrero, Mexico, Recent. USNM (type series).
8. Panama, Recent. USNM (type series).
9. Veracruz, Mexico, Recent. USNM (holotype).

| Species | $\overline{X}$ | O.R. | N | Locality number as above |
|---|---|---|---|---|
| | | Length, $M_1$ | | |
| *cumberlandensis* | 2.2 | 2.0–2.3 | 8 | 1 |
| ?species | 1.6 | 1.4–1.9 | 28 | 1 |
| *californicus* | 1.9 | 1.8–2.0 | 10 | 2 |
| *floridanus* | 2.05 | 2.0–2.1 | 2 | 3 |

| Species | $\overline{X}$ | O.R. | N | Locality number as above |
|---|---|---|---|---|
| *floridanus* | 1.7 | 1.5–1.9 | 8 | 4 |
| cf. *leucopus* | 1.6 | 1.4–1.7 | 18 | 5 |
| cf. *maniculatus* | 1.5 | 1.4–1.7 | 48 | 5 |
| *thomasi* | 2.9 | 2.5–3.1 | 5 | 7 |
| *pirrensis* | 2.5 | 2.5–2.6 | 4 | 8 |
| *nelsoni* | 2.5 | – | 1 | 9 |
| | | Width, $M_1$ | | |
| *cumberlandensis* | 1.3 | 1.3–1.5 | 8 | 1 |
| ?species | 1.0 | .8–1.2 | 30 | 1 |
| *californicus* | 1.3 | 1.2–1.4 | 10 | 2 |
| *floridanus* | 1.2 | 1.2–1.4 | 2 | 3 |
| *floridanus* | 1.2 | 1.0–1.3 | 7 | 4 |
| *thomasi* | 1.6 | 1.6–1.8 | 5 | 7 |
| *pirrensis* | 1.8 | 1.8–2.0 | 5 | 8 |
| *nelsoni* | 1.5 | – | 1 | 9 |
| | | Length, $M_2$ | | |
| *cumberlandensis* | 1.7 | 1.6–1.8 | 9 | 1 |
| ?species | 1.2 | 1.0–1.4 | 11 | 1 |
| *californicus* | 1.5 | 1.3–1.6 | 10 | 2 |
| *floridanus* | 1.6 | – | 1 | 3 |
| *floridanus* | 1.4 | 1.3–1.6 | 8 | 4 |
| *oklahomensis* | 1.7 | – | 1 | 6 |
| *thomasi* | 2.0 | 1.8–2.1 | 5 | 7 |
| *pirrensis* | 1.8 | 1.8–2.0 | 5 | 8 |
| *nelsoni* | 2.1 | – | 1 | 9 |
| | | Width, $M_2$ | | |
| *cumberlandensis* | 1.4 | 1.3–1.5 | 9 | 1 |
| ?species | .9 | .8–1.0 | 12 | 1 |
| *californicus* | 1.4 | 1.4–1.5 | 10 | 2 |
| *floridanus* | 1.3 | – | 1 | 3 |
| *floridanus* | 1.2 | 1.1–1.3 | 8 | 4 |
| *oklahomensis* | 1.3 | – | 1 | 6 |
| *thomasi* | 1.6 | 1.5–1.8 | 5 | 7 |
| *pirrensis* | 1.6 | 1.6–1.8 | 5 | 8 |
| *nelsoni* | 1.5 | – | 1 | 9 |
| | | Length, $M_3$ | | |
| *cumberlandensis* | 1.6 | – | 1 | 1 |
| *floridanus* | 1.2 | 1.1–1.3 | 8 | 4 |
| *pirrensis* | 1.4 | 1.3–1.5 | 5 | 8 |

| Species | $\overline{X}$ | O.R. | N | Locality number as above |
|---|---|---|---|---|
| | | Width, $M_3$ | | |
| *cumberlandensis* | 1.4 | – | 1 | 1 |
| *floridanus* | 1.0 | 0.9–1.2 | 8 | 4 |
| *pirrensis* | 1.4 | 1.3–1.5 | 5 | 8 |
| | | Length, $M^1$ | | |
| *cumberlandensis* | 2.3 | 2.1–2.4 | 7 | 1 |
| ?species | 1.7 | 1.5–1.9 | 19 | 1 |
| *californicus* | 2.0 | 2.0–2.2 | 11 | 2 |
| *floridanus* | 2.1 | – | 2 | 3 |
| *floridanus* | 1.8 | 1.7–2.0 | 8 | 4 |
| *thomasi* | 2.9 | 2.5–3.1 | 5 | 7 |
| *pirrensis* | 2.5 | 2.5–2.6 | 5 | 8 |
| *nelsoni* | 2.8 | – | 1 | 9 |
| | | Width, $M^1$ | | |
| *cumberlandensis* | 1.4 | 1.3–1.5 | 7 | 1 |
| ?species | 1.1 | .9–1.2 | 19 | 1 |
| *californicus* | 1.4 | 1.3–1.6 | 11 | 2 |
| *floridanus* | 1.4 | – | 2 | 3 |
| *floridanus* | 1.3 | 1.2–1.6 | 8 | 4 |
| *thomasi* | 1.6 | 1.6–1.8 | 5 | 7 |
| *pirrensis* | 1.8 | 1.8–2.0 | 5 | 8 |
| *nelsoni* | 1.6 | – | 1 | 9 |
| | | Length, $M^2$ | | |
| *cumberlandensis* | 1.7 | – | 1 | 1 |
| ?species | 1.3 | 1.2–1.4 | 3 | 1 |
| *floridanus* | 1.4 | 1.3–1.5 | 8 | 4 |
| *thomasi* | 2.0 | 1.8–2.1 | 5 | 7 |
| *pirrensis* | 1.8 | 1.8–2.0 | 5 | 8 |
| *nelsoni* | 2.0 | – | 1 | 9 |
| | | Width, $M^2$ | | |
| *cumberlandensis* | 1.5 | – | 1 | 1 |
| ?species | 1.0 | .9–1.2 | 3 | 1 |
| *floridanus* | 1.3 | 1.2–1.5 | 8 | 4 |
| *thomasi* | 1.6 | 1.5–1.8 | 5 | 7 |
| *pirrensis* | 1.6 | 1.6–1.8 | 5 | 8 |
| *nelsoni* | 1.5 | – | 1 | 9 |
| | | Length, $M^3$ | | |
| *cumberlandensis* | 1.2 | – | 1 | 1 |
| *floridanus* | 0.97 | .8–1.2 | 8 | 4 |

| Species | $\overline{X}$ | O.R. | N | Locality number as above |
|---|---|---|---|---|
| *thomasi* | 1.3 | 1.2–1.3 | 4 | 7 |
| *pirrensis* | 1.3 | 1.3–1.5 | 5 | 8 |
| *nelsoni* | 1.3 | – | 1 | 9 |
| | | Width, $M^3$ | | |
| *cumberlandensis* | 1.3 | – | 1 | 1 |
| *floridanus* | 0.95 | .8–1.2 | 8 | 4 |
| *thomasi* | 1.4 | 1.2–1.5 | 4 | 7 |
| *pirrensis* | 1.3 | 1.3–1.5 | 5 | 8 |
| *nelsoni* | 1.3 | – | 1 | 9 |
| | | Length, lower molar row, $M_1$-$M_3$ | | |
| *cumberlandensis* | 5.2 | 4.8–5.6 | 2 | 1 |
| ?species | 3.95 | 3.9–4.0 | 1 | 1 |
| *californicus* | 4.6 | 4.4–4.9 | 10 | 2 |
| *floridanus* | 4.7 (est.) | 4.8 (est.) | 2 | 3 |
| *floridanus* | 4.4 | 4.2-4.7 | 8 | 4 |
| *thomasi* | 5.8 | 5.4-6.2 | 12 | 7 |
| *pirrensis* | 5.9 | 5.6-6.1 | 12 | 8 |
| *nelsoni* | 6.2 | – | 1 | 9 |

TABLE 4

COMPARATIVE MEASUREMENTS (IN MM.) HUMERI AND CALCANEA, VARIOUS GENERA OF SMALL MAMMALS, CARNEGIE MUSEUM COLLECTIONS

| Species | Locality | Age | Width, distal end of humerus | Greatest length, calcaneum | Greatest width, calcaneum |
|---|---|---|---|---|---|
| *Tamias striatus* | Pennsylvania | Recent | 5.6 | – | – |
| *Peromyscus cumberlandensis* | Maryland | Pleistocene | 5.1 | 5.8 | 3.7 |
| *Oryzomys palustris* | Florida | Recent | 4.6 | 5.1* | 3.0* |
| *Peromyscus floridanus* | Florida | Recent | 3.8 | – | – |
| *Microtus pennsylvanicus* | Pennsylvania | Recent | 3.7 | – | – |
| *Peromyscus leucopus* | – | Recent | – | 3.8* | 2.3* |
| *Peromyscus maniculatus* | – | Recent | – | 3.2* | 1.9* |
| *Peromyscus m. bairdi* | Pennsylvania | Recent | 3.1 | – | – |
| *Peromyscus* sp. | Maryland | Pleistocene | 3.2 | – | – |

* Data from Stains, 1959

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